

February 1, 1930

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AVIATION

The Oldest American Aeronautical Magazine



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The Oldest American Aeronautical Magazine

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A LOCKHEED FOR COLONEL LINDBERGH



Last summer Colonel Lindbergh laid before Lockheed engineers specifications for the type of airplane which would meet his ideas and requirements. It should incorporate the latest development in aircraft engineering and design. It should be powered with a proven type of engine and, therefore, obtain efficiency through aerodynamic design, rather than through additional power. It should have a maximum top speed, together with a large carrying capacity, and a landing speed which would permit the use of undeveloped airports far from organized airways.

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According to the agreement between Colonel Lindbergh and the Lockheed Corporation, the plane was not to be paid for until its performance was satisfactory. In California last month Colonel Lindbergh took delivery of the first Lockheed Sirius and expressed his approval of the design. As a result of the performance tests of Colonel Lindbergh's plane, the Sirius has been made a standard model in the famous Lockheed line.



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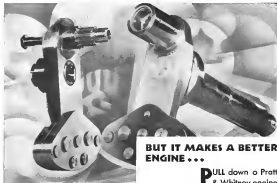
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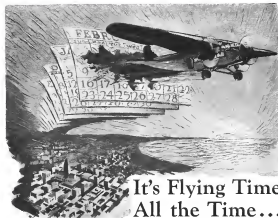
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As applied to the aircraft industry in Los Angeles County, these factors mean uninterrupted operation and additional profits for the manufacturer.

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**LOS ANGELES
COUNTY**

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AVIATION

THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

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EDWARD P. WARNER, Editor

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Back to 1910

PIONEER HISTORY is repeating itself. The days of county fairs flying are coming back. Au Carbo and Wright save their teams forth to display their products to a piping throng twenty years ago, as now a great merchandising organization is planning a tour of the country by a group of representative commercial aircraft, under the guidance of a human legions of agency and hypodermic.

We hope for the best, but we await the outcome with some misgivings. It is a little doubtful if even the camera showman will be able to handle a crowd less going out to look at standard commercial products, such as operate regularly at the airport, without putting on a display that will obscure them, from any notion of personal flying. The National Air Year may seem to contradict that fear, but there the competitive element has to be considered as a powerful factor of the attraction.

Nevertheless, and however this mass proliferation of standard products may turn out, it has the germ of a very fertile propaganda. Shortly after the first public displays at Port Myer and the first meet at the old Dominguez Field in Los Angeles the public was eager to see straight flying by any airplane, because any airplane was a novelty. Two years ago the Ford Motor Company sent a plane on tour, and again the public turned out in masses only to gaze, for in most communities a multi-engine all-metal transport plane was still a novelty. The same game can be worked again, and repeatedly, given not only showmanship in presenting the display but a definitely humane element in the show itself.

Let us be specific. We have repeatedly made it clear that we are without qualification opposed to the public starting of non-military airplanes before crowds of people. If it, we are satisfied, the worst possible

publicity. On the other hand, there is flying that is normal and confidence-inspiring and yet outside the experience of the ordinary observer. There are airplanes of which the reputation assumes an interested audience.

Let us be more specific still. A concrete example of what we have in mind is furnished by the recent winner of the Guggenheim Society competition. Let the Curtiss Designer go on, and it will need but little stage management to get an audience. The crowd will gather to see straight but picturesque flying over towns, as they did when Brookins and McCarty, both of them now captains of industry, were heroes of the hour. A machine which does not even need an airport, but which is literally able to land in a tennis court and take off from a football field, is going to give not only the aviation fan but the lay public a brand-new idea of flying. We venture to express the hope that the citizens of many scores of communities will be given the opportunity of seeing demonstrations similar to that offered at Mitchell Field on the day when the safety prize was awarded.

If it were only the financial future of the builders of the winning airplane that would be involved in such a tour, it would be important for us to offer any suggestions. They are perfectly capable of deciding for themselves what will best promote their interests. Our concern is for the general good of aeronautics, and we can think of nothing that would be more helpful than to crystallize upon the really sensational machines displayed in the course of the Guggenheim competition.

We need to convince the public that flying is safe. To show them airplanes that can be pulled off the ground at barely thirty miles an hour and at a thirty degree angle, that remain under control under the most cheer and aggravated flight conditions and

In defiance of the most deliberately bad piloting, that can be flown straight back into the ground without any maneuvers for landing and without injury, will be worth many pages of argument. We only regret that the legal disputes between the winners and their closest competitors obscure any prospect of having the two go on a grand circuit of displays together. As entrants stand, all possible publicity should be drawn from (not merely for) the winners. The same course should be followed with any other airplane that promises exceptional and obvious and spectacularly and spectacularly demonstrable contribution to safety, reliability, or economy. "Hippodroming" can be brought back in 1930 if the right planes and the right methods are used, and hippodroming can be made respectable.



The Glider Came

THERE WAS A GREAT WAVE of glider activity in America some twenty years ago. Scores of groups of youths, fired with enthusiasm by accounts of the first public display by the Wrights and Curtiss, began expectantly to assemble odd bits of lumber and sheets of fabric into structures of more or less questionable rigidity and safety. An intercollegiate association came, progressed to the point of staging an intercollegiate glider meet, more nearly self-organized than any aeronautical event that the colleges have held since, for the contestants designed their own machines, built their, flew them, and managed their own show without exterior control and with only very limited assistance by interested amateurs and faculty members.

It passed. In 1916 gliding, with the exception of sporadic efforts by a few widely scattered experimenters, seemed to have joined the Great Ark in the limbo of extinction.

Nineteen twenty-two brought it back, washed in on a tide of wonderful stories from beyond the Rhine. The Germans had adopted gliding (perform, under police) instruction, and had proceeded with scientific thoroughness to raise motorless airplane performance to levels theretofore undreamed of. The real explanation of those hour glides being too simple for the Japanese to credit, some of the journalistic writers to the camp in the Rhinegorges proceeded to embrace much more land and more palatable theories of their own, and to republish their readers with accounts of fine-aste misadventures. By different spread again.

The German records produced glider construction and glider events in France, England, Algeria, Russia, and Switzerland. In America they produced little except a wealth of speculative conversation. The plan to hold an American meet slipped into oblivion after some abortive attempts to find a satisfactory site, and by 1925 gliding

was again, as it had been four years earlier, an almost purely German pastime.

Now it has returned to America again, again from within a German root, and it comes under more favorable auspices than on any previous occasion. It is being pushed with more energy than ever before, and a definite appeal is being made for the support of the aircraft industry, upon the theory that the glider will lead its users toward the market for power-driven aircraft. Is it worth while?

We think it is—upon certain conditions and with certain reservations. We do not see in gliding, so far as model flying, any prospect of pronounced addition to the aircraft market. Practically all of the young glider enthusiasts of our acquaintance yearn toward aerodynamics as a profession. They want to become pilots, designers, executives. They want to take money out of the industry, not put it in. Some of those who start on the glider will be drawn from wealthy families, will take up the sport purely as such, and will ultimately buy planes for personal use, but they will, we believe, be relatively few. The rest use of the glider to aviation lies elsewhere.

It lies in making aviation more appealing to a larger part of the public. It lies in striking another blow at the "aeroplanes" notion. Mr. Samuel Fish, progressive insurance broker, will probably cover by a glider, but when he finds that his young brother and his nephew and the neighbor's boy across the street are soaring upon the wings of the wind he will find it difficult to continue thinking of aviation as something remote and mysterious—and he may decide to take the air route upon his next trip to the coast, and reflect very seriously upon the necessity of having an office plane for his associates and himself to do their traveling in. Therein, from our point of view, and quite apart from its place as a sport, gliding will have earned its keep.

But there are conditions and precautions. Gliding with a rapidly lengthening death roll would be worse than no gliding at all. The home-made glider must be slowly evolved. The fledgling pilot's soaring ambitions must be kept within bounds. Clubs must be content to go slowly, and to get plenty of advice as they go. Seasoned aeronautical experts will have to give freely at their counsel.

There is ample experience to show that gliding under proper control can be both safe and amusing. It cannot acquire a great vogue in America simply by a misdirected transportation from Germany. The German work is admirable. We cannot praise it too highly, but it has inherently been planned with special reference to German geography, economic conditions, educational system, and temperament. It requires definite adaptation to American conditions, with appropriate modifications in the methods of practicing the pastime. The National Glider Association, by promoting gliding under a reasonable policy, by avoiding the exaggerated claims and exaggerations to which propaganda associations often

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deliberate, by critically and separately judging each of its own proposed activities by the definite benefits that can be foreseen for American aviation, will earn respect and will receive it.



Selling Airplanes, Not Stunts

SOMEWHERE BETWEEN the extremes of glib aggressiveness and headless pessimism about the aircraft industry of today there lies a rational middle ground of fact. There is a change impending, and prejudice colors our interpretation of the partly natural forces at work.

The true situation is relatively simple. We appear to be approaching the saturation point of the present airplane market, under present selling policies. If aviation has had a bad selling policy it has been chiefly expressed by exploiting the occasional flying ability of certain individuals, and inviting all the world to buy a plane and do likewise, or better. Every manufacturer of planes has publicly gloried in the record-breaking achievements of air performers using his planes.

All this speculation about the current aviation situation comes as an indication that the basic aim of aviation has served its purpose, and that we are entering the business era of aircraft development. Every successful industry sooner or later enters this dollar-and-cents phase, and by its achievements there, and there alone, measures its true worth to modern world progress and stable financial success.

Common sense will readily reveal that no business, and aviation is after all a business, can indefinitely continue solely as a heroic, romantic phase. The fall between is not the expression of some mythical law of cycles, but only an inevitable of reality which can be measured by reasonable analysis and logical anticipation.

The man who flies is still too much of a hero in the public eye, a sort of expression to be admired and imitated. The great performer deserves our tribute, and to them all honor and credit is due, but aviation is growing up, and genuine business success is not founded on heroics.

Each new milestone in aviation achievement is now concerned about the man who flew the job. The daily press tends his first, the manufacturer loses his sales argument on it, the vast array of suppliers to the aircraft industry proudly broadcast their part in his success, and the man in the street applauds and steps on the ground. The actual performance, the spectacular flight, the record-breaking event—all are dramatized in terms of the pilot, and the airplane performer is finally dazzled by the glory of this band of mortal men.

The aviation industry, in its headless sense, willfully participates in this hero making, for in addition to a genuine admiration for their achievements, it regards

them as good publicity. Up to what point are they really good publicity? The rock of the battle in increased aeronautical activity is increased sales development—and this in turn is very definitely limited by the number of men available to fly the planes.

Much has been said about the accuracy of finding some easier and less expensive method of making flight training available to the average individual. Undoubtedly this will come in due course, either through reduced costs through present flying school classes, or by isolating flight training in the purchase price of a plane. One thing is certain, however, that the more we bring to flight training a group of prospects who are attracted by practical interest in aviation, and who bring to that training an experience, position and degree of respectability in the business world that means practical success, the more we will increase the sales of planes. The day of the mere boy without background attracted to flying chiefly because of its heroic possibilities, and bringing in his training little more than vague interest and desire, is no more.

The coursework of an air line is essentially like the duration of any other transportation enterprise, and it is significant that among the most successful operators are several with previous motor bus or taxi cab experience. The pilot of an air liner has a responsibility akin to that of the captain of a passenger vessel at sea, and he should have a similar place in the community. His skill and experience must be great. No one should be allowed to retain the notion that mindlessness and thoughtlessness of the morrow are his chief characteristics. We are progressing in the right direction, but progress must continue.

The change can be logically fastened by the aircraft industry and those vitally interested in its success. Why should a plane manufacturer not advertise the number of new licenses they trained on his plane in a month or year? Or they record of freedom from accidents? Or a flying service that a business man had obtained his license after only so many days of training? Or again, a manufacturer that business organizations had met his planes in so many hours of business flying a year? These are the things that make the average man feel that he too can fly a plane, and, if he has the financial resources he should purchase one. The situation is after all within reasonable control of the aviation industry itself, for it can all be controlled by the content of the industry's own publicity.

The automobile industry long ago discovered that we can't all hope to be Ralph De Palma. This 100,000-mile continuous run made by a stock car on a speedway—who recalls the names of the drivers? The pilot is empirically entitled to his place in the sun, but he is in big enough to appreciate that his industry must come first. The industry is absolutely dependent upon the need of convincing the average man that he, too, can use a plane—his own plane.

THE French AIR-BOAT LINE TO South America

By CHARLES H. GALE
Assistant Editor of Aviation

FOR ALMOST TWO years Toulouse, France, and Buenos Aires, Argentina, and intermediate cities have been linked by a fast air-boat service operated under French auspices. The company charged with this operation is known as Compagnie Aeropostale Generale, and the line has commanded the attention of the aeronautical world from the very beginning because of the audacity of the conception behind it, because of the persistence with which it was developed in the face of extreme difficulties, and because of the excellent record that the company has maintained.

The line had its beginning more than eleven years ago in the last months of the World war, and continued through three difficult phases, as experience and financial strength permitted. Latécoere Air Lines, with M. Pierre G. Latécoere, well known aircraft builder, as president, was formed to promote the project, and with comparatively little in the way of precedent and under no illusions as to the proportions of the difficulties and problems involved, the company began operations. On Sept. 19, 1939, a year following the first proposal of the

Economic rivalry in international trade has ceased at least three nations—France, Germany and the United States—to undertake trunk air mail projects to the key cities of the South American continent. France was the first to start construction of such an airline and the first to begin operation. The fact that it was proposed and authorized in the latter part of 1918 lends additional interest to this pioneering effort. What the French have accomplished and propose to do in the future in South America is particularly pertinent to American aviation just now in the light of similar projects being promoted by the Pan American Airways and the New York, Rio, & Buenos Aires interests.

project the 226-mile line linking Toulouse and Barcelona was extended 943 miles farther to Casablanca, Morocco, in northwestern Africa. On June 1, 1925, almost six years later, this line was extended another 1,750 miles to Dakar, Senegal, on the western coast of Africa.

Three years of the three sections of the proposed airline to Buenos Aires, that between Toulouse and Dakar then having been completed, then remained the problem of spanning the South Atlantic Ocean to the East Coast

of South America and constructing an airline along that coast to Buenos Aires. For a time various seemingly insurmountable difficulties made realization of these two sections only a remote possibility. In 1935, however, the solution to the remoteness presented by the South American situation was found in Manuel Bonalume-Lafont, who had spent about 20 years directing various extensive enterprises in South America, met Mr. Latécoere, became interested in the possibilities of such an airline, and proposed to take part in the scheme. The Compagnie Generale Aeropostale was organized to take over Latécoere's Air Lines. Additional capital became available and the whole plan of promoting the airline was immediately speeded up. In two years the survey from Buenos Aires to Natal on the eastern coast of Brazil had been completed, and on Nov. 15, 1937, the first mail was flown over that survey.

There now had been established two of the main sections of the airline. This remained the problem of crossing the South Atlantic between Natal and Dakar. It has been, and still is, the dream of the company to operate flying boats on this section, making the service exclusively by air from start to finish. Because of the unsuitability of flying boats, dispatch boats were installed as temporary substitutes. The French government stepped into the breach with the offer of some shadow destroyers. These were put in operation on March 1, 1938, completing the France-Buenos Aires service.

Thus, in less than ten years, the wartime dream of Mr. Latécoere, buttressed later on by Mr. Bonalume-Lafont and his associates, had come into being. This is an air-boat service, but fast mail-contractual mail service had been established, and work could be saved in the communication and transportation of parcels.

In the months since the opening of the complete service, the organization has been making every effort toward refinement, so that the maximum may be obtained in speed and reliability. Besides a high degree of skill



and expertise on the part of the pilots and efficiency of mechanics, radio men, etc., as indispensable, it was obviously necessary to have an unusually well-developed line of the part of each department throughout the company. That a very satisfactory degree of co-ordination has been achieved is evidenced by the fact that the length of time required to complete each trip has been lowered

from two weeks or more in the beginning to an average of slightly more than a week at the present time.

This low elapsed time between Toulouse and Buenos Aires has been achieved in spite of the fact that the pilots fly by night over much dangerous terrain and are without many of the aids which mark North American routes. Particular reference is made to the absence of survey beacons along the South American routes and some parts of the Toulouse-Dakar sections. The record for the entire 7,793 mile trip now stands at 178 hr., 15 min., or 7 days and 9 hr. Of this total of 178 elapsed hours, including all stops, more than 100 hr. were consumed by the dispatch boat getting across the South Atlantic.

Toulouse is considered the start of the South American airline. Here the mail is centralized from various European countries and all parts of France for the South American mail planes. Schedules are arranged so that connections with Peru and Baderia are available up to the time of the take-off. This service is 2,923 miles long. Up to April 13, 1939, the weekly plane took off every Friday, but beginning on that date the take-off has been each Sunday morning. About a dozen stops are made before reaching Dakar. The mail is rushed steadily



A group of Latécoere type 10 mail planes on the tarmac for review of the Toulouse airport, the northern terminal of the line.

oward as rapidly as weather and general operating conditions permit. At conditions are normal the mail reaches Delator about Monday noon, or during the afternoon. Here it is put aboard one of the dispatch boats which immediately speeds southeast toward Natal.

In covering the Toulouse-Delator section it is necessary to fly over the Pyrenean Mountains between Spain and France, across the Straits of Gibraltar and along inhospitable stretches along the western coast of Africa. At the completion of the first year of operations on March 1, 1939, there had been an almost perfect record of trips completed on this section. Of the 104 trips scheduled 103 were completed. Not all of these were completed on schedule, of course, but with the exception of the two mentioned all the others were completed with no more than slight delays.

The two failures to complete trips were occasioned in both cases by accidents. One attracted world-wide attention because the pilot and radio operator, after having been forced down in country controlled by a hostile force, were captured and held prisoners for several months. It was some time before the Company became definitely aware of their fate, and much time was consumed after that in negotiating for the release of the aviators by payment of ransom. The other accident is presumed to have been a forced landing off the coast on the Canablands. Up to now, as the pilot and plane disappeared without any trace.

According to the official report of the company made in October, 1938, the average time required to cover this section has been as follows: South-bound planes going toward Delator, 66 hr in September, 1938; 44 hr 42 min in March, 1939, and 39 hr in September, 1939. For north-bound planes going toward Toulouse, 78 hr in September of 1938; 30 hr 25 min in March of 1939, and 43 hr 45 min in September, 1939. The record for the trip is 22 hr 15 min. It is the hope of the Company to bring the regular average for this section down to 24 hr. These times include all stops and represent the elapsed time between the take-off and arrival at the two terminals.

On account of the inhospitable country in Northern Africa, it has been the custom of the company to operate an accompanying plane between Canablands and Delator. Since May, operating conditions have been such that this accompanying plane, which must go to the assistance of a mail plane in case of a forced landing or other difficulty, has been discontinued. This has been brought



See Delator, one of the six dispatch boats now being used to carry the mail between Delator and Natal. This type will be replaced by faster, more modern craft this summer.

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about by the improved mechanical efficiency of the flying equipment.

Most of the airports on this section are government installations. The planes used were originally for mail and express only, but the new Latécoere 28, and eight-passenger cabin machine (described in AVIATION, Dec. 7, 1937), is being substituted gradually, so that passengers may be accommodated. This plane is a new product of the Latécoere airplane factory, and inauguration of passenger carrying on the various sections of the airline will coincide with the general introduction of the new equipment.

Quite a different chapter has been written in the development of Natal-Buenos Aires section, because of the complex nature of the project. There was absolutely nothing to start with, and the company, like South American enterprises in Latin America, had to build its own airway and airports, import and install its own equipment, and cope with the various difficulties peculiar to South American terrain and political conditions.

This line is 2,855 miles long and extends southward from Natal along the eastern coast of the South American continent, touching at various important ports, including Rio de Janeiro, before reaching Buenos Aires. Two subsidiary companies were organized in South America to facilitate the acquisition and installation of airports. Rio de Janeiro has a government airport which the company is able to use but all the others were built by the company.

Although the airports are lighted there are no beacon lights to guide the pilots over these parts of the route covered by night. The radio equipment on each plane is depended upon for weather and atmospheric information, and the pilot's detailed knowledge of the terrain over which he is operating is depended upon for navigation. Every one of the 104 scheduled trips during the first year was completed. Last plane built for mail and express only are used. On this section, however, as on the Toulouse-Delator section, passenger planes are to be installed as rapidly as they may be produced by the factory.

Up to April 13, 1938, the Europe-bound mail left Buenos Aires early Thursday at midnight. Since that date, however, a later early Saturday at midnight and is scheduled to reach Natal by the latter part of the next Monday afternoon when it is transferred to the dispatch boat and shipped eastward to Delator. This route has been born on a weekly schedule, but is now to be operated bi-weekly. The next flight from Natal and Africa will be shipped only once a week.

The bi-weekly schedule will offer better service between the cities along the route and is designed to meet competition which is developing from airlines of other nations, particularly the companies representing United States interests.

According to a recent report of the company, the following average times for this section have been made:

For the south-bound mail from Natal, 79 hr in September, 1938, 54 hr in March, 1939, and 43 hr in

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September, 1939. For the north-bound mail from Buenos Aires, 56 hr in September, 1938, 36 hr in March, 1939, and 45 hr, in September, 1939. The record for the north-bound trip is 35 hr and the record for the south-bound trip from Buenos Aires is 39 hr. Both of these were made in 1938. Buenos Aires still is considered the starting point for the European-bound mail, although there is an important connection to Santiago, Chile.

Aeropostale is very strong in South America, having been the pioneer in the inter-continental air mail service and because of its contracts with a number of the important South American countries. These contracts give the company preference for a considerable proportion of mail from Argentina, Uruguay, Chile, Paraguay, Venezuela, which is divided for Rango and Africa. This arrangement is similar to the terms of the contract which has been awarded to the New York, Rio de Janeiro & Buenos Aires Line, namely, a certain percentage of all mail destined for Europe and Africa, in to be sent by Aeropostale (and for the United States in the case of the American company). This includes not only and definitely posted as air mail, but other classes as well.

THE LATER-NATAL section was the last to go into operation. It represented the actual taking up of the two last sections and the completion of the entire route between France and South America. Adoption of dispatch boats made it the most simple of the three sections to put in commission but it has been the most difficult from the strictly mechanical point of view. The airline must have given rather satisfactory service. Operation is expensive and the machinery is delicate, requiring large repair bills. At present six cruises, but eight, four motor boats, two oil tankers and one water tanker, are used to maintain this cross-ocean service. To maintain the service the Company has ordered four new cruisers for delivery next summer. These are to be equipped with 1,350 hp. Diesel engines and, besides having a speed of 14 knots will enable a voyage of about 4,000-5,000 in operating costs.

The company is still strong toward the development of a flying boat type which will be practicable for this section. When such machines actually go into operation their four new dispatch boats will be used to go to the aid of the aircraft in difficulty or for transferring the mail across the ocean when prolonged storms interrupt the flying schedule. Early inauguration of the flying boat facilities is not expected by the company. Everything along this line is deferred frankly to be routine. No effort is being spared to secure the desired machine, however, it is understood that Latécoere is giving special attention to this in her factory and that two large flying boats, one of two engines and the other of four engines, are under construction. The Rethelich Rometz boat from the German company by the French government was acquired with this South American line particularly in mind. It is said by the New York representative of



The new Latécoere combination passenger and mail plane, designated as type 28.

the company that it is possible that one of the new Latécoere 28 machines fitted with pistons might be placed on the cross-ocean line if the events of competition required such drastic action before the flying boat had been developed.

It is necessary to recall that up to recently, the German plane for a similar airline to South America included installation of flying boats on the ocean section at the very outset of the service. Following the failure of the Rometz type to come up to Luft Hansa's expectations it was decided to adapt temporarily the French method of using dispatch boats. The German service has not been founded yet. The chief problem in this European-South American service, it will be seen, is the trans-formation of the air-boat service into a strictly air service.

The boats ply between Natal and Delator by way of the Cape Verde Islands and the Island of Fernando de Noronha. In the latter two locations and at St. Louis (north of Dakar on the west African coast) and at Natal, seaplane stations have been built in anticipation of the flying-boat service.

The average time required to cover the 2,084 miles of this section is about 94 days. This means that the majority of the time required to make the entire trip from Toulouse to Buenos Aires is spent covering the ocean. The record for the crossing is 163 hr, made on the second trip in 1939. The average time is between 108 and 115 hr. Since the record for the entire trip between Toulouse and Buenos Aires made at 127 hr 15 min, it is understood readily why the company is so anxious to solve the problem of flying the Natal-Delator section. Greater speed on the two land sections depends directly on the development of faster aircraft, aids to navigation, etc. but a tremendous advance will be achieved by the substitution of flying boats on the third section.

In South America the most important break line is the extension of the Natal-Buenos Aires line 745 mi. west from the latter city to Santiago, Chile, with a stop at Montevideo in western Argentina. Since this trip requires about a day, the mail from Toulouse may reach the Pacific Ocean in a little more than eight days. Plans on this airway must recognize the Andes as an altitude of about 21,000 ft and with temperatures far below zero in the winter season. In spite of these hazards and difficulties, the route is considered very worth while and inasmuch as it enables mail to reach Chile from France in almost one third the time required by surface transport.

Two other lines are operated in South America—both by subsidiaries. A line connecting Buenos Aires and Asunción, capital of Paraguay, is operated by one subsidiary and a line from Buenos Aires and Bahia Blanca to Comodoro Rivadavia, in the southern part of Argentina, is operated by the other. This latter includes an air-mail service, planes being operated between Bahia Blanca and Comodoro Rivadavia, and trains between Bahia Blanca and Buenos Aires.

Extension of the Company's lines north from Natal to points in French Guinea, Venezuela and the West Indies is under serious consideration. Survey flights have been completed, concessions received for airport sites and permission granted by the various countries involved to fly across their territories. Operation of this line would permit mail to reach Venezuela and the West Indies from Europe in eight days. Study progress in the promotion of this new line is planned in order that the company may be the first to secure the advantage in economic relations the line would afford.

ON THE EUROPEAN side of the ocean the company operates the following routes: France to Algeria, France to Morocco, France to French West Africa, and France to Spain. It has in the process of organization the very important trunk airline linking Paris, Marseilles, Oren, Calcutta, Elizabethville, Niger and Madagascar. This latter line, 1,490 miles long, is being developed by the French-Tunis-Algeria Airlines, which was organized by Compagnie Generale Aeropostale. The French Government owns one-third of the company and Aeropostale one-third. Since this guarantees the Belgian Congo, development has been carried out jointly by the French and Belgian interests and it is understood that operations will be shared also, alternate trips between the European and Congo terminals being made by French and Belgian planes.

It is interesting to note that the company's airplane service between Marseilles and Algiers is treated again as a good deal of general "school" in water flying in anticipation of the eventual flights over the Atlantic.

The flying equipment of an airline has a great deal to do with the efficiency of that line, of course. In the Aeropostale service, the Latécoere 22 and the Latécoere 26, the former a cubic monoplane powered with a 450-hp Renault, and the latter an open cockpit monoplane powered with the same engine, are both popular. The company has a great many Bregets, but these are gradually being retired in favor of the newer types. The company also has some Latécoere 32 flying boats, and C.A.M.S. and Loire-Olivier flying boats. On Dec. 31, 1928, the flying equipment of the company was distributed as follows: 14 Europe and Africa 31 Latécoere machines, 57 Bregets, and one each of the Potez 25, Potez 32, and Normandie 340, types. In South America there were 40 Latécoere machines, and 14 Bregets. Of course the machines located in Europe and Africa are operated on lines other than the trans-Atlantic service. This company also uses 14 flying boats. The great total of land and sea-planes on the above date was 178.

At the same accounting, the company had 1,227 water-cooled and piston air-cooled engines, a total of 1,846. Only 125 of the number were rated at 400 hp. or over. Renaults and Lorraine-Dietrichs are the most and equipment.

At the start of the air-boat mail service, an average of fifteen days were required to complete the air trip

from Europe to South America. This was slowly reduced to eight days. The northbound trip in the early months required something like seventeen days to complete, and that too has been reduced steadily. It should be mentioned that mail taken about a day longer going to Europe than in the opposite direction. This is because of prevailing winds and ocean currents in favor of the South America-bound traffic. There is a 44-hr. difference between time in Buenos Aires and Toulouse to be reduced with, also.

In 1928 the company's planes flew 1,680,355 mi. on all its routes. On the Natal-Buenos Aires route alone 210,062 air-mile flew. In 1929, the year of the company's origin, a total of only 112,047 mi. were flown on all its lines. This was increased to 244,614 the next year, and by 1933 the figure had passed the 1,000,000-air-mile going to 1,051,630 mi. There has been a steady growth every year.

It is obvious the routes operated by Aeropostale require flying over some rather difficult terrain and the excellent operations record which appears in all the years creditable on that account. Up to Sept. 30, 1929, 1,430,030 mi. had been flown in that zone and it is expected the figure for the entire year would be more than 2,000,000 mi., as compared with the 1,660,000 mi. for 1928, which in turn was 17.8 per cent larger than 1927. This mileage includes 536 trips over the Pyrenees Mountains between Spain and France, 62 trips over the Pirene Nevada in Spain and France, 62 trips over the Alps over the Mediterranean Sea and 394 trips over the Desert of Mauretan in northwestern Africa, the Andes and across the Brazilian jungles.

AT THE CLOSE of 1928 there were in the employ of the company: 30 airport managers, 80 pilots, 30 chief mechanics, 210 mechanics, 53 radio operators, 25 electricians, 30 commercial agents, 57 clerks, 60 mail offices, 260 stables and crew, and 160 various specialists.

Table 1—Balance Sheet as per Dec. 31, 1929

Values in millions of francs (of 100 francs)

	1927	1928
Assets		
Cash and bank	11,153,647	15,375,671
Receivables	13,448,100	17,880,000
Advances—suppliers, agents	7,385,116	2,013,170
In-flight funds—passengers	1,000,000	1,000,000
Advances and supplies	26,099,316	32,091,113
Organizations expenses	22,246,301	14,113,756
Reserves for contingencies	1,053,843	1,571,125
Total assets	59,016,023	64,054,726
Liabilities		
Capital stock	40,000,000	40,000,000
Reserve	1,889,000	3,663,000
Reserve for depreciation	1,726,000	2,513,000
Profit and surplus payable	302,362	1,168,447
Accruals	702,729	1,168,447
Reserve for interest on share capital	49,000	74,000
Debt	22,014,441	41,221,044
Total liabilities	65,962,529	89,743,938

	Profit and Loss Account	
	1928	1929
Operating expenses	\$1,719,437.14	\$1,713,755.96
Services to heads and general expenses	228,400.00	262,000.00
Interest on debt	40,000.00	40,000.00
Depreciation	39,455,331.11	47,457,116.00
Profit	22,014,441.11	32,224,113.00
Total	\$1,960,168.25	\$1,960,168.96
Assets		
Income from debt	\$1,376,416.00	\$1,793,500.00
Commercial income	72,953.00	36,800.00
Surplus income	2,862,718.00	3,400,000.00
Total	\$1,651,632.00	\$1,651,632.00

February 4, 1930

February 1, 1930



Aeropostale first on the line at Buenos Aires. Note definition given under line of wings.

This represents a total of \$415. Of course these people were employed on all of the lines of the company and not exclusively the France-Buenos Aires line in which we have been chiefly concerned in this article.

A new agreement with the French government was signed on August 2, 1929, and was to become effective as soon as the necessary law had been voted. This agreement effected the sphere of operations of the company and also the matters of form of subsidy and the general financial structure. The company is to have exclusive operation rights in the south of France, west of and including the Marseilles-Algiers line, everything in South America south of the Tropic of Cancer and in Africa, everything west of a line linking Algiers and Lake Chad (in the northeastern corner of Nigeria, north Central Africa). This concession has been conceded to a period of 20 years with reciprocal liberty of cancellation after the first 10 years. The company has an option to renew the concessions under equal conditions at the date of expiration.

The present capital of \$1,170,000 is to be raised to \$2,540,000 and the French government will receive \$385,000 in shares in return for the concessions granted. Thirty per cent of the capitalization will consist of A shares having five votes each and 70 per cent of B shares, which carry a vote of one vote for every 20 shares. It has been provided that the company may with the approval of the French government issue bonds guaranteed by the government up to five times the share capital. A bond of \$750,000 is to be deposited by the Company with the government.

One of the Company's most valuable assets lies in the special agreements and contracts it holds with various governments in Europe and South America. These effect mail and express operating rights enjoyed by the Company. Most of the European countries now agree to send certain amounts of their mail to South America through the Company's lines. The last two to take advantage of this service are Spain and Italy. The arrangements with the South American countries, mentioned above, amount to even more.

One thing about Aeropostale quite contrary to the practice of American air transport companies is the availability of a detailed account of its financial condi-

tion and all phases of its operations. This probably is accounted for by the fact that the Company is subsidized by the government and, therefore, is answerable more or less to the public, whereas in this country all the air transport lines are private with only indirect aid in the manner of air mail contracts, etc. Inasmuch as the financial structure of any organization is what might be termed an "X" factor, a knowledge of conditions is extremely valuable to both the expert and the layman alike.

All of the figures quoted here were compiled from the report and the directors of the Company at the Paris meeting Oct. 31, 1929.

Narrowing our observations for the moment to the France-Buenos Aires line, we find that the income per trip from Buenos Aires to Europe on Jan. 1, 1929, was \$2,000, and on August 9 that this income per trip had reached to \$7,200. The increase is said to be the same on the reverse journey from France to South America.

Regarding this income report from the individual trip to the total income yielded by the entire line by each quarter, we have: In 1928, second quarter, \$34,626; third quarter, \$32,381; fourth quarter, \$37,094; a total of \$94,001. In 1929, first quarter, \$48,614; second quarter, \$68,027; third quarter, \$110,311; a total of \$325,952.

In recent years there have been three issues of bonds to back up loans needed for expansion and organization purposes. There was an issue of \$3,000,000 in bonds of \$30 each in 1927, an issue of the same amount in bonds of \$40 each in 1928 and the increase in share capital in 1929, already referred to.

ALSO in operation is expected by the Company for at least the first year, of any service. This was true of the Dakar-Natal-Algiers Africa sections of the France-Buenos Aires line. These two sections of the line are scheduled because the first year of their operation was completed within the scope of this report, the Toulouse-Dakar section having been opened much earlier. The loss for the first year was \$600,000.

The Company's balance sheet and profit and loss account as reported in October, 1929, is shown in Table I. Stimulation of economic relations and development of communications are the motivating forces behind the Aeropostale activities at the present time. German and United States interests have recognized the value of airfares for the same reasons and have sought to make the advantages of such air service in South America. Behind the United States projects stand a vast amount of capital, a resource which gives the American concern a certain advantage. Aeropostale looks upon this, however, without alarm, being firm in the conviction that the months of experience it has derived in actual operation of the line to South America is a more valuable asset. It believes unshakeable rivalry in the field sooner or later but is confident of its position in the ultimate picture.

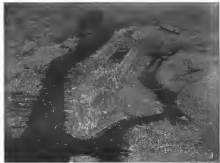
SURVEYING THE

Airport Problem IN NEW YORK CITY

The Last of Three Articles on a Problem Typical of Most Great Cities

By JOHN C. HOLME, JR.

INSOPAR as it is possible, the use of seaplanes or flying boats for passenger service to and from New York City is more logical than the use of landplanes, since numerous areas of quiet water suitable for take-offs and landings are to be found within a few minutes' distance from the center of Manhattan. At present, however, only two such areas have been developed for transport service. Other suitable locations have been carefully considered by the committees studying the plan which was discussed in the first article [see p. 11], and by other agencies. The two areas now in use may both be reached from Times Square in 15



A photograph of New York City from the air.

minutes, making them closer than any existing airports, and four proposals for additional seaplane facilities are now under consideration. There are also three seaplane airports at a greater distance than the 30-minute radius from the business district.

The North Beach site of New York Air Terminal, Inc., is at present much more readily accessible than is any other landing field or seaplane harbor. Located on Long Island Sound near Hell Gate, it is only three miles away from Times Square and is at a distance of only one mile by road. A company boat made the trip from 42nd Street and East River in 24 minutes. An additional 15-minute taxi ride from Times Square makes the total 39 minutes. Via 59th Street bridge and Queens Plaza, the driving time is 35 minutes, the route being marked by arrows. The port is also accessible by the Flushing L.R.T. train to 74th Street and Broadway, a

22-minute trip, plus a 15-minute taxi ride to the Beach, making the total traveling time 37 minutes.

This port is used by Corvus-Wright Flying Service for charter and taxi work; New York and Suburban Air Line for charter work. The equipment at the port includes one tugboat, a dock, raft, three speed boats and a club house. The flying equipment includes Iroquois and Sikorsky six yachts, Savoia-Marchetti flying boats, and Panchetti seaplanes. The boat house and veranda of the club house give the port a yacht club atmosphere. There is adequate unobstructed take-off in Bowers Bay in any direction, and the area is lighted at night. This water area is ideal for seaplane landings and take-off, as it is unobstructed either by river traffic, drift-wood or physical obstructions on the nearby shores. A 200-acre airport now under construction adjacent to the dock will afford complete facilities within a year.

A solution to the downtown Manhattan, Wall Street and Brooklyn area has been found by Atlantic Coast Airways whose flying boats are met by a company boat from pier A of the Battery in a 10-minute run, pier A being 15 minutes by subway from Times Square. The total trip from Times Square is 30 minutes, from Wall Street, 15 minutes. To date aviation interests regret the rejection of proposals for leaving space for a seaplane ramp or dock without harbor on any of the islands in New York harbor. Atlantic Coast Airways has solved this problem of the need of seaplane facilities in the harbor by leasing 250 feet of waterfront property from the Jersey Coastal Railroad at Jersey City, on which site they will build a ramp and seaplane craft. The take-off areas is free from the deluge, traffic, and physical obstructions encountered in any other seaplane landing or take-off area in the East or Hudson rivers. The shallow water in this area makes it both impossible for harbor craft to maneuver in the take-off area and in addition makes take-off easier and faster. The Weather Bureau reports that there is an average of ten days per year of dense fog at the Battery.

The use of a proposed development of seaplane facilities at Port Newark Municipal Airport. It has been suggested that some seaplane facilities adjacent to the downtown harbor area be used for servicing and storing seaplanes, using only the harbor waters for picking up passengers. The Newark airport is 45 minutes from Times Square via the Holland Tunnel and Lincoln Highway entrance, and 30 minutes from downtown New York over the same route. Another solution to this seaplane facility problem will be offered by the completion of the Seacoast New York Air Terminal's seaplane base. How also will be sufficient area for construction of adequate service facilities and hangars. As mentioned in the description of the Seacoast airport [see p. 25], this site is 30 minutes by Holland Tunnel and Old County Road from Times Square, being only 7 minutes from the Canal Street end of the Hudson Tunnel in downtown New York.

The proposed Jersey City airport at Dwyer's Point, N. J., on Newark Bay, will also offer seaplane accommodations when completed. This site is 38 minutes from Times Square via the Holland Tunnel and Hudson Boulevard, or 38 minutes from the Canal Street end of the Hudson Tunnel.

The American Aeronautical Corporation, manufacturer



The seaplane harbor at North Beach.

of Savoia-Marchetti flying boats and seaplanes, will develop New York Seaplane Airport at Port Washington, L. I., Manhattan Bay of Long Island Sound, 15 miles by air from Times Square. This site was 20 minutes by automobile via 59th Street bridge, Queens Plaza, Northern Boulevard to Port Washington and the airfield, with company signs indicating the route. Long Island Railroad trains running every 40 minutes make the trip to Port Washington in 48 minutes with an additional 3-minute taxi ride to the field, bringing the actual traveling time up to little over one hour. This site is already in use for the Savoia-Marchetti factory on Manhattan Isle, but a considerable extension of the present area to include hangar service and school accommodations, is planned. Floating docks and passenger accommodations are included in the proposed complete seaplane airport to be completed within a year. Although this location is too distant from the metropolitan district to be used for passenger service, it can be used as a seaplane base and it is intended to be used for a seaplane pilot club. Its location in Manhattan Bay is appropriate for this purpose. Manhattan Bay is large enough in every direction for seaplane landings and take-offs, but there is an abundance of boats and yachts in the bay which at times would make it necessary to land or take-off outside of the bay after a taxi run from the Manhattan Island floating dock. The Flushing Bayside Municipal Airport, Brooklyn, 68 minutes from Times Square by taxi or subway, also has proposed seaplane docks and accommodations which will make this location another desirable site for a seaplane operating base. The plan of having an outlying harbor for service and repairs of flying boats and seaplanes has worked out efficiently in this instance. The New York City Airport, Inc., development on Flushing Bay will also provide seaplane facilities. On this site as an aeromarine park project, suggested by Hon. William F. McCracken, is included in the proposed development. Other seaplane facilities existing now for seaplane landings and take-offs, but without service or hangar facilities, are located

at Rye, Westport, Glen Island, and Seaside (Brooklyn). N. Y. However, all of these sites are beyond the 30-minute riding range from the business district of Manhattan.

THE Kew-Forest-Lincolnson shipbuilding factory uses the East River adjacent to their East 28th Street factory for loading and take-off of factory shipments. This site has been proposed for the development of a passenger terminal but has been rejected because of physical disadvantages. Pilots who have used this site say it is unsuitable for the loading and taking off of a fully loaded transport plane because of deflection of river traffic and physical obstructions on a coast river take-off. It is reported that the city is willing to finance and push this development as well as the 145th Street Hudson River development of seaplane facilities, assisting the endorsement of the aviation industry interested.

The development of the 79th Street and Hudson River site has been opposed by the Riverfront Park Committee, the Park Avenue Baptist Church and Columbia University, but on this instance as well as in other cases lack of establishment of such bases has been due to lack of concerted action on the part of aviation officials. It seems a case of individuals being defeated by larger so-called public interests. When it is realized that the air-mindedness of New Yorkers demands the establishment of adequate seaplane facilities, this question will become a public problem and as such will have considerable additional interest. As to the possibility of developing proposed seaplane sites far defuncted, and arranging interlining river traffic, it has been the experience of yacht clubs and commercial interests to have failed in such attempts. However, if suitable seaplane bases for the New York metropolitan district become a public issue, it is no doubt highly probable that something in this direction will be accomplished.

The meteorological report in the Fact-Finding Committee report states that dense fogs occur in the central part of the city about seven days a year. This is less than the report of 20 days a year down bay for the Battery area, making upland locations more desirable from the meteorological point of view. However, river traffic, tall apartment on the New York side and the Hudson on the New Jersey side, make approaches on coasts river take-offs and landings hazardous. The city of New York (Board of Estimate and Apportionment)

is willing to appropriate necessary funds for the development of a 145th Street Hudson River seaplane terminal, but in addition to the above disadvantages there is the gross disadvantage of remote location from the business section that makes the development of this approach are highly improbable. One airline has occasionally picked up passengers on the Hudson River west of 79th Street, but this is not a general practice and is considered impractical.

The Regional Plan Committee and members of the Fact-Finding Committee regret the impossibility of establishing an airport on Governor's Island for the Brooklyn-Wall Street area. However, Atlantic Coast Airways have been serving daily passenger service from New York to Atlantic City from the water area between Ellis and Bedloe's islands. The New York Air Terminal's seaplane facilities at North Beach make special arrangements for passengers along Cactus-Wright Flying Service and New York and Suburban Air Lines on aerial and taxi charter service to be met by speed boat on any dock on the island of Manhattan, transporting them to a seaplane or seaplane lying at the nearest available take-off location in the harbor. However, this arrangement has not yet been put into general use.

AT THE PRESENT TIME, three lines are operating regular planes and seven companies operating flypools on regular schedule from three airports or seaplane bases near New York. Each of these three, Newark, North Beach and Hudson airports, has under way extensive improvements and plans for extensions of facilities for next year. New York Air Terminal's Seaplane Airport and New York City Airport on Flushing Bay, Queens, will be ready for operation within a year. Atlantic Coast Airways will have its seaplane base on the New Jersey side of lower New York Bay ready within that time. By the end of 1933, therefore, the New York area is assured of comparatively adequate facilities for the immediate needs of its air transport services.

A large part of the credit for these improvements must be given to the Fact-Finding Committee for New York Metropolitan Airports, and to the committee which prepared the comprehensive Regional Plan for New York City and its Environs. Thanks to them, also, the Metropolitan area is assured of further increases in its transport facilities as they become necessary to meet air traffic developments for a great many years to come.



Aerial photograph of the site of the Seaplane Airport on the bank of the Harlem River, N. Y.

COMBATING Corrosion OF AIRCRAFT

Metal Parts

By J. E. SULLIVAN

Buyer of Aircraft
Navy Department

THE IMPORTANCE of properly protecting the various parts of an airplane, particularly the metal parts, cannot be too strongly emphasized. Metal, especially in the planes used in the construction of aircraft, will corrode rapidly if not suitably protected from deteriorating influences. These harmful influences are obviously more actively at work in salt-laden atmospheres than in inland sections but they are always present and too much care cannot be taken to combat them.

The cause and prevention of corrosion of metal aircraft parts with all of its serious economic results has become a matter of prime importance. The progress of corrosion can only be prevented by the use of a perfect insulating layer between the metal and corroding elements. A completely impervious protective coating is unknown, consequently one should speak in terms of retarding, arresting and not in absolute terms of prevention and elimination.

Unfortunately many manufacturers fail to appreciate the necessity of employing satisfactory protective coatings on aircraft and in some instances when the necessity of this protection is recognized, the best known practices are not always correctly applied. Very often it is a case of lack of knowledge.

At one time a manufacturer of aircraft was so far behind in production and deliveries that his only aim was to turn out airplanes and in his haste—a natural consequence of such a condition—very little attention was accorded to the matter of protective coatings. Two coats of a fairly good looking finish were applied to the

"Save the Surface and you Save All" may not always be true as applied to airplanes, but it is a matter of great importance, and one which has often been overlooked. Particularly is it important as regards possible corrosion of metal parts, in places which are not easily accessible either to inspection or repair. Mr. Sullivan offers herewith a detailed discussion of preparing metal surfaces, proper coating, inspection and maintenance to insure adequate protection against possible structural failure due to corrosion.

structure, the greater part of which was steel, but apparently no care was used in applying the coatings nor was any effort made to ascertain whether the finish was satisfactory. A number of these planes, destined to operate near the sea coast, were in such poor condition after four months' service that they required a major overhaul. Two of these planes, after one hundred and fifty flying hours, were considered so seriously deteriorated from corroded structural members that it was necessary to decommission them and relegate them to the scrap heap.



Deterioration due to scale corrosion of the two covers

AVOIDING PARTS in an airplane is something to be avoided, particularly a structural part. It not only tends to shorten the life of the plane and makes the removal of the part necessary, but it is probable that it will fail at a critical moment and result not only in the destruction of the plane but in serious injury to the occupants. Such parts are undeniably a constant source of danger and although periodic inspection of a plane may often reveal corrosion in accessible parts, the chief source of

danger lies in the inaccessible locations where the action forces have unaided. Structural failure which is quite infrequently accelerated by secondary stresses in the ultimate result.

In many investigations of failures of corroded aircraft parts, it has not always been possible to definitely determine the cause of the deterioration. It could have been assigned to a number of causes any one of which it would have been reasonable to assume was the true cause, such as improper selection of material, or incorrect manufacturing practices, for example, improper heat treatment. In the majority of cases, however, it would have been just as reasonable to assume that the parts had not received proper surface protection. While this may not have been the chief cause for their unsatisfactory condition, it was perhaps a contributing factor.

Reasonably effective protection can be obtained, regardless of the type of service to which the plane is to be subjected. This can be accomplished only by strict adherence to four fundamental principles. The disregard of even one will in all probability be conducive to a poor job. The requisite principles are as follows:

- (1) Proper preparation of the surface to obtain good adherence of the paint.
- (2) Selection of good quality finishing materials.
- (3) Thorough drying between coats.
- (4) Frequent inspection and maintenance of protective coatings.

Experience has shown that to obtain good paint adherence it is necessary that the surfaces be thoroughly clean at the time the initial coat of finish is applied. This may be accomplished in many ways, depending upon the material to be cleaned. Inasmuch as the metals used at present in the construction of aircraft are steel and aluminum alloy the discussion will be confined to these two materials.

If practicable, all steel parts except tubing should be cadmate plated. Tubes are generally not plated so there always the possibility the plating solution may lodge inside the tubes and ultimately be responsible for corrosion of these parts. The coating should be uniform in thickness and of such a quality as will withstand at least a one hundred-hour, twenty-percent salt spray test without any signs of rust appearing. Immediately after plating, the parts should be given a coat of primer, especially if they are not to be used for any length of time. For the best results unpainted parts should be thoroughly cleaned down to bare metal before the initial finish is applied. Cleaning of such parts may be accomplished by many methods but regardless of the process it is essential that it be one that will not injure the material.

Pickling and sandblasting are recommended methods. Since the interior surfaces of tubes are inaccessible pickling can be more advantageously employed than the other sandblasting. In pickling either the best commercial sulphuric or muriatic acid may be used. When sulphuric acid is used the bath should contain either five to ten per cent by weight of concentrated acid or seven and one half to fifteen per cent by weight of 66 per cent concentrated acid. The best results with muriatic acid are obtained from a bath containing twenty-five per cent of concentrated acid by weight.

A recommended pickling procedure is as follows:

- (a) Immerse in bath heated to about 140 deg. F. to 150 deg. F. for a sufficient length of time to effect

removal of the oxide or scale. The length of time varies. However, ten minutes should suffice.

- (b) Drain all acid from the parts and rinse in cold water.
- (c) Rinse in a lime bath for about five minutes, drain and then rinse in clean hot water. The lime bath may consist of approximately twenty pounds of either quicklime or slaked lime per one hundred gallons of water. The bath ought not to be heated.

FOR REMOVED SURFACES, low pressure sandblasting is considered more highly efficient. Many manufacturers of steel fastenings sandblast the completed fastenings following this by a blast of air in order to remove any



See type machine with tape to permit inspection of lower sections.

loose material resulting from the sandblasting. A coat of primer is immediately applied thereafter.

For aluminum alloys the anodic oxidation process has repeatedly demonstrated its superiority to all other surface preparations. This process not only cleans the surface thoroughly but it forms an extremely good base for the protective coatings. In itself it is not a satisfactory protective coating, but there is absolutely no question as to its value as a base for further finishes.

The Bureau of Aeronautics Navy Department, as a result of extensive laboratory and service tests of anodized parts has concluded that the anodic treatment is superior to any previous method and specifies it in all production work involving the use of aluminum alloys.

The majority of the reputable aircraft manufacturers in this country who employ aluminum alloy in any extent are equipped for this process. The treatment consists of immersing the part in a chromic acid solution through which an electric current is directed, the part under treatment being the anode. The film produced is extremely thin and adheres so firmly to the metal that it could be considered a part of it. The process removes the polished surface characteristic of aluminum and its

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alloys and imparts a light gray velvety appearance to the material.

Solvents such as carbon tetrachloride and benzol and several cleaning compounds based on trichloride phosphite may be used but are not recommended unless the use of the anodic treatment is impracticable. When a solvent is used, thoroughly rinse the cleaned parts in hot water to insure complete removal of the solvent from the surfaces, as its presence adversely affects the adherence of the paint.

Regardless of the method of cleaning, apply a coat of the initial finish as soon as the parts have been cleaned, otherwise these parts may react in contact with grease or oily hands or other objects which would vitiate the advantages gained by cleaning.

THERE are a variety of so-called "Aircraft Finishes" commercially available. Practically every paint and varnish concern of any size enters that the paintball industry is no longer in its infancy, but it still tends to look with its older and well-established competitors, and that to enter it is a sound business policy. As a consequence, each has its line of "Super" materials. Most of these concerns will supply any airplane manufacturer with exactly what he requires, but unfortunately some manufacturers are not aware of their needs. Such a condition is apt to accrue to the financial benefit of the paint producer but it is not always beneficial to the aircraft manufacturer or purchaser. Conditions, however, are improving gradually and aircraft manufacturers are beginning to realize the advantages of specifying materials conforming to their own specifications determined by experience to be the most suitable for the purpose intended.

In the selection of a finishing material an airplane designer qualifies himself by the pointing factor and sets the desire for a quick drying material on a highly polished surface.

On steel parts an iron evidencing chromate oil base compound has been found to be excellent for a priming coat. Such a primer is not expensive and a number of good finishing materials of this type are readily available.

Quoted below is a formula for a primer which has proved satisfactory under hard service.

Zinc chromate	81.5 per cent by weight
Iron oxide (Fe ₂ O ₃)	15 per cent by weight
Silica	79.3 per cent by weight
Gum	0.5 per cent by weight
Linseed oil	15 per cent by weight
Milled spirits	32.5 per cent by weight

A properly applied finish coat should dry hard and should be flexible, durable and resistant to oil, gasoline and sea water. A paint which will meet these requirements is suitable as a protective coating for aircraft parts.

THE Navy Department has obtained excellent results with a gray enamel. This enamel consists of between twenty-five and forty per cent pigment by weight. The pigment of this finish is basic carbamate white lead instead

with carbon black to a dark gray shade. The remainder is high-grade zinc spar mixed in a vehicle.

Standard procedure on steel parts of Naval Aircraft calls for oxidation plating followed by one coat of iron oxide primer and two coats of gray enamel. Cadmate appears to give better protection and is generally more durable than other types of metallic coatings. Further, the process of application is comparatively simple and the required equipment is not as complicated as for expensive coatings.

Instead of a recommended as a coating for the ladders of closed tubular members, the oil usually being forced under pressure into the capillary openings. When each member has been thoroughly constructed by the oil it is drawn by means of small holes drilled at various locations in the structure. The holes may be sealed by means of cadmate plating drive screws. To coat the interior surfaces of tubing in this manner each member of the fuselage must be disassembled with its adjoining member so that complete circulation of the oil takes place. The entire assembly will be secured. Some manufacturers treat each tube individually, pumping it through one hole at the bottom until it comes out of another hole provided at its upper extremity and then draining. Others immerse the completed fuselage in a bath of heated oil after the holes have been drilled in each of the members.

ON the pioneer airplane manufacturers in the country, has developed in cooperation with the Navy Department and the Aeronautics Company of America, a process for protecting duralumin which at present stands alone and unequalled. [The writer is here dealing only with protective coatings added on the surface, and is generally excluding Alclad from consideration.—Ed.] This company makes all duralumin parts as described previously and follows this treatment with two coats of aluminum pigmented titanium paint.

Two pounds of No. 140 polished aluminum bronze powder per gallon of titanium paint has been found to be the best mixture. This paint, the Alclad aluminum, should be used for anodized parts only. Aluminum titanium paint has two disadvantages; it cannot be satisfactorily applied in places exposed to the sun, as the sun softens it, nor can it be used where it might come in contact with gasoline as gasoline dissolves it. Each places a combination consisting of iron oxide primer and two coats of enamel should be used. This latter finish is not entirely satisfactory but is as good as any known. A finish consisting of two coats of aluminum titanium has been used by some manufacturers with much success on parts adjacent to gasoline tanks. Still, however, is not a desirable finish for



Standard fabric covered structure with Alclad inspection holes

head and shoulders "only" to a full length of the applicant with a background varying from an airplane to a bevy of girl friends.

The accompanying organization chart will give some idea of why some have more stamps before a license can be issued. At first glance, it would appear that the government red tape is in evidence, but when one considers that this work is nationwide in scope, that a district supervising inspector is responsible for an area equal in size to that of the United States and that the registration station must have sufficient records to intelligently answer any intermediate correspondence, the steps are clearly seen to be a very definite purpose.

THE REGISTRATION SECTION is divided into eight specialized groups. In normal procedure, all groups indicated on the chart are involved. The applicant submits application in duplicate. The applications are received and checked by the applications group. Any error in an application is corrected either by correspondence or by the return of the application. The original copy of the application then goes to the files group for future reference. The duplicate copy is forwarded to the license group, which checks for routine approval in case of pilot only and forwards all classes of applications to the supervisor of the district in which the applicant desires to be examined. After examination, or inspection, as the case may be, the application and graded examinations are returned to the license group which checks for com-



Registration chart of the licensing service

pletion of applications are being received with tests attached, direct from the supervisor.

Every pilot has been made to develop a system of transfer of title of aircraft which will be legally sound yet simple enough to expedite action. When a number is assigned to an aircraft, whether temporary, license or identification, a form known as "Record, Transfer and Reassignment" is also made to the owner of the aircraft. This form is evidence of title for the purpose of registration only, and, when properly completed and returned to the Department of Commerce, is sufficient evidence for a transfer of the title and a reassignment of the number or license to the new owner.

UNTIL VERY RECENTLY an aircraft could not be licensed in the name of the purchaser where the purchaser could not submit a bill of sale showing that the aircraft had been paid for in full. A system of lien recording has now been developed whereby this can be accomplished.

Before the applicant home may be issued the applicant for license must supply a certified copy of bill of sale conveying title to the aircraft to himself. For this purpose confidential bills of sale are not acceptable.

The purchaser or operating agency will be supplied with a bill of sale conveying legal title to the aircraft.

The financing agency should take back any type of instrument desirable and that department should be notified of the lien received by a notice of lien in the form of an affidavit, substantially as follows: (See Fig. 1)

The foregoing affidavit is for the protection of the financing agency and the responsibility for its completion and forwarding to the Department of Commerce by the applicant rests entirely with the agency.

If the financing agency will supply a true bill of sale and a notice of lien as described, license will be issued to the owner and stamped "Subject to Lien."

When the lien is satisfied the financing agency should supply this department with a notice of release, reading substantially as in Fig. 11.

Upon receipt of this notice by the Department, the record of lien will be removed and license will be issued to the owner of the purchaser without "Subject to Lien" being stamped thereon.

A widespread interest has been evidenced in the new pilot's ratings. The rating system was developed through the desirability of serving a closer classification of those persons licensed to carry passengers for hire. The Air Commerce Regulation were revised to include the new rating system, effective as of Sept. 1, 1929, and are now being issued.

AVIATION February 1, 1930

AVIATION February 1, 1930

The new license are radically different from the old license, both in size and content. Transport and limited commercial pilots are issued rating sheets in conjunction with their licenses.

The identification portion of the license consists of picture, description, general classification of transport or limited commercial pilot, and a space for periodic renewals. The identification sheet, without the accompanying rating sheet, permits the holder to pilot all types and classes of licensed aircraft but does not permit the holder to carry passengers for hire. The identification sheet will be issued by the Department of Commerce at Washington and is designed to cover a five-year period. The prescribed one-month renewals will be accomplished through the inspectors in the field and without any contact with the Washington office.

THE RATING SHEET, when properly endorsed by a Department of Commerce inspector, designates those types and classes of licensed aircraft in which the holder is authorized to carry passengers for hire and, like the identification card, is designed to cover a five-year period.

Transport and limited commercial pilots carrying passengers for hire will be rated according to these sheets. Each rating must be qualified for individually and the fact that a man qualifies for the highest rating does not automatically qualify him for the lower ratings.

The license forms for private and restricted pilots have been revised to conform to the new transport and limited commercial licenses, but will not include a rating sheet attachment as both private and industrial pilots are prohibited from carrying passengers for hire by the Air Commerce Regulations. These licenses also are designed to cover a five-year period, and the prescribed yearly renewal is to be accomplished through the inspectors in the field and without any contact with the Washington office.

As can readily be appreciated, the issuance of the new rating sheets to all of the limited commercial and transport pilots now holding the old form of license constitutes quite a problem. In order to accomplish this with the least possible confusion, all substitutions of new licenses for the old will take place at the time and as a renewal of the old license.

In the renewal of an expired limited commercial or transport pilot's license of the old form, this office will issue the identification half of the new license accompanied by a 60-day letter of authority. As previously stated, the identification portion of the license authorizes the holder to pilot all types of licensed aircraft, but does not

authorize the carrying of passengers for hire. However, the letter of authority does authorize the holder to carry passengers for hire in licensed aircraft for a period of 60 days and under the same terms as the old license. Within the 60 days it will be necessary for the holder to secure a rating sheet designating the types and classes of licensed aircraft in which the holder desires to carry passengers for hire.

This rating can be obtained from the nearest Department of Commerce inspector upon suitable demonstration of ability to pilot the various types and classes of aircraft for which a rating is requested. These rating sheets will be issued solely by the inspectors in the field and not from the Washington office.

The new license for private and industrial pilots will also be issued as renewals of the old licenses, and since no rating cards are involved, will be issued as a straight renewal as before.

Looking ahead with the aeronautical industry, it is unreasonable to assume that many more changes will not be necessary in the total licensing forms and procedures. However, in the light of past experience such changes can be accomplished without delay or misunderstanding to the applicants.



Pilot's rating authority building questions as to fees

THIS IS TO CERTIFY that a Bill has been received by the undersigned owner of the Aircraft described herein, No. _____, Department of Commerce No. _____, in favor of _____.

It is intended that this notice be recorded with the Department of Commerce at Washington, D. C.

Witness my hand and seal this _____ day of _____, 19____.

Signature _____

Notary Public _____

Subscribed and sworn to before me this _____ day of _____, 19____.

Notary Public _____

"To be filed and if applicable to be reprinted."

THIS IS TO CERTIFY that all fees received in favor of (Private Old License) Aircraft described herein, No. _____, Department of Commerce No. _____, have been fully satisfied.

It is intended that this notice be recorded with the Department of Commerce at Washington, D. C.

Witness my hand and seal this _____ day of _____, 19____.

Signature _____

Notary Public _____

Subscribed and sworn to before me this _____ day of _____, 19____.

Notary Public _____

"To be filed and if applicable to be reprinted."

Owner: Pilot's Rating, Fig. 12

plaintiffs and then forwards them to the proper licensing group. The license is mailed direct to the applicant from the licensing group.

However, as look at the chart shows the vast saving in time and money that could be saved if applications were submitted direct to the district supervisor rather than the Washington office. The possibility of this procedure has long been recognized, but before making it effective the field office will have to be strengthened and organized to assume the additional duties. This is almost accomplished, and at the present time a fair per-

RECENT Airplane AND Engine DEVELOPMENTS

Sunbeam CABIN BIPLANE



FACTORY PRODUCTION has been started on the "Conquest" biplane. Col. James H. Doolittle, of the United States Army, is the designer of the Sunbeam Cabin Biplane. The plane has been built more than 100,000 and is presently being built in the United States.

The Sunbeam was designed and built in Kansas City, by Mr. Hugh L. Thompson, now chief engineer for the Los Angeles company, which is producing the plane. The plane is a single bay biplane with a cabin seating four passengers and an open cockpit at the rear and where the cabin seats into the pilot and a passenger. Craft of its distinctive features is the use of aluminum bonded steel wing ribs throughout wings and struts, and free power bracing of the fabric covering the wings and struts.

Upper and lower wings are built in two pieces, the upper wings being bolted to a center section and the lower wings to the lower fuselage structure. Spars are of solid laminated spruce, with aluminum bonded steel compression members as well as steel ribs.

Forward is used over the leading edge of the wings which are fabric covered, covered and fastened by means of the skin with a formula perfected by Dr. Q. T. Hodkinson and Dr. W. W. Sherrill, Los Angeles chemist, the treating solution being marketed under the trade name "Ecothane" by the Eonic Chemical Corporation, Ltd., of Los Angeles. Wing beams may also be rendered fire resistant by impregnating them with "Ecothane" solution. Experiments have been conducted in an effort to render dopes and paint impervious as well as fibers but such a development is not yet on the market. It is said that this solution does not affect materially from ether freighting instruments except that a leader has been incorporated in the

formula which acts up against crystals in the case of fabric tears.

Fuselage construction is of rigid frame welded steel tube, fabric being assembled with light metal strips changed to the main structure and covered with fabric which is doped and impregnated in the wing. A wide center section is mounted above the cabin to the top longerons by means of four short struts. Two interbay struts are used between each pair of wings and all bracing is with MacAlister aluminum wire.

Five pieces are considerably used in the side cabin, or the main body, but are quickly removed to permit of carrying forward. An open compartment in rear of and above the main cabin is fitted with dual controls of Deperdussin type and contains ample space for two pilots or a pilot and passenger. Landing and navigation board lights are standard as in a full set of instruments.

A double aluminum firewall is mounted between the engine compart-

ment and passenger cabin and the oil tank is carried in the fuselage. Gasoline tanks with a capacity of 75 gal. are carried in the wings and fuselage with a pump in the wing tanks which aspirates gasoline from the oil tank at all angles. An exhaust ring collects the burnt gas and expels it through a ramjet, mounted behind and to the rear of the passenger cabin.

Engine mounters are of steel tube construction, with a vertical member forward to the tail post, by means and the tie braced to the stabilizer with wire. All surfaces are enameled and of light metal.

Splice axle landing gear of conventional type is mounted, axle shock struts being used and 52 by 6 in. tires being carried on 30 by 8 in. wheels with an externally operated flexible brake. Tail and is provided for easy steering and shock absorbers through a hydraulic shock.

Specifications and performance figures are supplied by the manufacturer as follows:

Length overall, 27 ft. 6 in.
Wing overall, 30 ft. 6 in.
Span (both wings), 34 ft. 6 in.
Chord (both wings), 10 ft. 6 in.
Crew, 2
Airtail section, 10 ft. 6 in.
Climax, 10 ft. 6 in.
Wing loading, 100 lb. per sq. ft.
Weight of plane empty, 1000 lb.
Payload, 1000 lb.
Displacement, 1900 lb.
Crew weight loaded, 300 lb.
Wing loading, 100 lb. per sq. ft.
Power loading, 12.5 lb. per hp.

THE Hodkinson TRANSPORT

A new plane recently introduced at the Los Angeles show is the Hodkinson transport, an impervious transport. The plane is powered with three Cessna Challenger.

Weighted 4000 lb. light and 7000 lb. fully loaded, the Hodkinson plane carries six passengers and two pilots in addition to 300 lb. of baggage. The plane is powered with three Cessna Challenger engines of 375 hp. each. Fitted with full lock, it provides equal of maintaining altitude under 1000 ft. on two or three engines.

Of step-plane type with both over-

board engine nacelles mounted directly on the upper surface of the lower wing, the Hodkinson plane is believed to be the first of this type to be developed in this country. This type of construction also lends itself readily to being housing of wings and nacelles provides better visibility from all compartments, and improves the aerodynamic efficiency of the plane by removing nacelles from the lower wing area.

In dual construction the plane features dual conventional fuselage with wood wings and steel tube fuselage, steel covered with fabric and doped. It is

Engine DEVELOPMENTS

planned to adjust the plane to all rural construction.

Both upper and lower wings are built in two pieces with no other section. Spars in the upper wing are of box type, while lower wing spars are of solid spruce, treated for lightness. All ribs are of spruce and plywood trim reinforcement, and both wing tips are built integrally with the wings. Plywood reinforcement is used over the main sections of all wing panels and V wings.

head only, a large open window at each side giving easy exit and view. Controls are of dual Deperdussin type. Brakes are operated from either side of the cockpit masterly by means of rubber pedals. An added feature is that all properties are mounted well forward of the propeller, giving a better view. All engines are mounted on a common pedestal unit. All engine instruments except tachometers are mounted on the same instrument board.

Fuel tank valves are located just below and in front of the left pilot's seat. A lever which controls the main control.



The Hodkinson 30-seater transport.

of fuselage along all trailing edges. Airtail of the plane is of the Deperdussin type, covered, are mounted in the upper wing only, the outer and being attached by the wing and operated by cables.

Bracing of the wings is provided by interbay struts.

Two doors are provided at the rear of the passenger cabin. Continuous windows fitted with safety glass provide wide range of vision from each side of the cabin. Six seats are arranged in pairs with an aisle down the center.

Safety belts are impervious against all winds. Walls and ceiling are finished in solid fabric with chairs leather upholstery and wooden sides of mahogany. Individual ventilators are provided at each seat and individual wing lights are also mounted above each seat.

The passenger cabin is 40 in. high in the outer side and 22 in. in the primary compartment. Baggage is carried in a large compartment in rear of the fuselage.

The pilot's cockpit may be reached through a large door from the main cabin, or by means of two outside doors. The cockpit seat is normally raised and has ample overhead room. Windshields are provided in front and rear.

side leading belts mounted in the lower wing. The engine is of the Deperdussin type, covered, are mounted in the upper wing only, the outer and being attached by the wing and operated by cables.

Bracing of the wings is provided by interbay struts.

Each of the Cessna Challenger engines is carried on a detachable engine mount and is protected by an aluminum fire wall. A 5-gal. oil tank is carried in rear of each engine which is supplied from a 10-gal. oil tank mounted in the upper wing panels. All tanks are of aluminum construction and all oil lines are of aluminum copper tubing with flexible rubber joints. Ten burner exhausts lead from each engine in beneath the lower wing, carrying the operation of the engine. Cooling around the nose of the plane is as follows.

Ten and stabilizer are of steel tube construction while the elevators and rudder are of duralumin structure. The rudder is balanced at the top and elevators are balanced along each side. Each elevator is mounted on a single torsion bar.

The landing gear, of unusually wide

track, is of conventional type with shock absorbers. Gross shock struts are used on the undercarriage and also for the tail wheel, which is of ground type. Airtail is of the Deperdussin type. Airtail section is of aluminum and is mounted on a common pedestal unit. All engine instruments except tachometers are mounted on the same instrument board.

Specifications of the Hodkinson Transport as supplied by Aviation by the manufacturer are as follows:

Length overall, 27 ft. 6 in.
Wing overall, 30 ft. 6 in.
Span, upper wing, 34 ft. 6 in.
Span, lower wing, 34 ft. 6 in.
Chord, upper wing, 10 ft. 6 in.
Chord, lower wing, 10 ft. 6 in.
Total wing area, 1000 sq. ft.
Airtail section, 10 ft. 6 in.
Crew, 2
Airtail section, 10 ft. 6 in.
Climax, 10 ft. 6 in.
Wing loading, 100 lb. per sq. ft.
Weight of plane empty, 1000 lb.
Payload, 1000 lb.
Displacement, 1900 lb.
Crew weight loaded, 300 lb.
Wing loading, 100 lb. per sq. ft.
Power loading, 12.5 lb. per hp.

A NEW

Salmonson ENGINE

The "Secret" of the "Salmonson" Engine has recently produced a new 300 hp. 16-cylinder diesel engine which is now on the market, intended to supersede their 124. 16-cylinder diesel engine.

The new type, known as 16-cylinder, has cylinders in a double-row arrangement, but having only the same 16-cylinder area that a 3-cylinder engine of same bore and stroke. The overall diameter is 40 in. only. Main components, such as pistons, valves, rod ends, etc., are interchangeable with the corresponding parts of the 9-cyl. 230 hp., 9-cyl. 200 hp. and 16-cyl. 320 hp. engines. This reforming is very important in view of the fact that the 16-cylinder engine is a 16-cylinder engine of the first type.

Main features are: bore and stroke, 12.5 by 16 in., compression ratio, 9.2



SIDE SLIPS

By
Robert R. Osborn

First Reports of Side Slips* Special Correspondent From the So-Called Sunny South

*FVB indicates airplane was involved in Mr. Ray W. Lister

Dear Editor,

Well sir, I know it may come to a great surprise to you and my entire circle of acquaintances in New Orleans instead of visiting the Miami Show as you expected. I decided to do this for a couple of reasons, the main one being I didn't get down here until about a week late for the Miami show anyway and I understood in the papers that they were able to struggle along without me at that show, although the attendance had fallen a lot after the people had found out I wasn't going to be there and many better companies had been on all sides. I wish the managers of these shows would explain to the audience people that a fellow like I can't get to all these shows at some points of the United States but to do without an actress. I believe, can't have the whole aviation business in the country as going to small part because they're holding a show somewhere.

Another reason I came here was I heard this one was getting what I had, I'd already indicated an interest when with anyone being built on all sides as young people doing along up here so called flying girls. What I mean is attendance is a joke of course as on account this expression getting such wide usage I might explain what I meant in the first place. I didn't mean when a show is announced that it is good or better as anything like that, except to persons to the nature of aeronomics. I wasn't here long enough flying fields or all his spare time as other such a ride even if he has to pay for it, an inside Aviation from then to then as all that. So you see I come here mainly to investigate the reports regarding this here city getting announced, but I am only going to be here a couple of weeks at the most as I may not be able to look into that side of things much on account I

having to look after the golf and horse racing situations first. So that there won't be any great evidence of this attitude, let me explain that this once again is only my great devotion to duty, for which I am partly famous. Everybody knows that with the present state of the so-called industry that this is more interest in golf as horse racing side of the than they it is airplane production. As I explained to you when I was up there, suppose some of our readers was to come here on direct lines, anything regarding the golf and horse racing industry, they would say what and the hell, what kind of a correspondent did you have down there anyway.

Well, Ed, let me set you straight again regarding the money work business. When I was down here two years ago it was so cold the golfing was practically ended as the only active business in the whole city was the Associated Grandstand on the Fair grounds risk track. Also the New Orleans—perhaps I'm not but first had to be several operations on account the hotel of housing me at the Mississippi. Well, Ed, two years ago the aviation reform act this was very unusual as would never happen again at a lifetime. Well like a reader I believed time as all I got to say is this, either this very short memories or very short histories down here. Everything is just as it was in it was when I left good old N.Y. When I was here last traffic was so bad on my mouth as now this has added horribleness to their confusion. I understand that this was unable to get some of the biggest from the south before the winter college as in, as new dog teams have to sent not to ensure the steering errors. Rumors has reached us also that the reason some of the horses I let on never showed up at the finish line was on account they being forced down by an

accident. Well, anyway Ed, what ever the reason was they surely to return closed as the horses as I am explaining that so an expense account won't really you so much as it seems to usually. This horse racing business is a fine outstanding sport, as and they is an appropriate from congress to take care of it, the overhead expense has to be handled by voters in this city. This is expected from all outstanding voters as I later you would want Aviation to take care of its share. I have entered this state under charitable contributions in an expense account.

Incidentally I has illustrated that very strong phenom, one very strong phenom—one very unusual thing about the climate down here. No matter how hard it rains anywhere else the water inside on the golf courses never ever gets cold. I went out to play the first day I got here hoping the course would be frost and give me driven golf distance and the course loose over so I could teach at them. The ground was frost OK, but the boards wasn't an all ordinary down rolled just far enough to run in them, or left just short enough to drop in. This frozen weather certainly interferes with an style of golf, which is known as the driving or croquet style in which a new and to the majority of pilots, after I developed it to its present art.

Well Ed, as I says I'll first look over the progress of the golf as horse racing industries as then if I have time still, as what is doing regarding aeronomics down here. Meanwhile if I can serve some startling news such as if I should break a course record or should be here without all other horses breaking their leg. I'll give you an idea you get out a special three star golf edition.

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Compare the scores and prices of the first ten air-
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Then WACO value will readily be apparent.

LOOK over the list of the first ten airplanes to finish the 1929 National Air Tour. Check their positions, total point scores, and the advertised list prices.

Here are the figures

Place	Score	Price*
1	45,672.64	\$7,335
2	41,108.81	7,835
3	38,494.03	48,000
4	38,494.03	85,000
5	33,277.40	14,950
6	31,098.22	15,950
7	29,711.81	6,325
8	28,304.18	6,575
9	28,211.62	6,750
10	28,096.60	51,000

Note that the first-place WACO has a lead of 7,178 points over the nearest competing make. Note that the winning WACO "225" Straight-Wing, listed at \$7,335, costs but \$1,010 more than the lowest-priced plane among the first ten . . . yet scored 53% more points for all-round performance in the Tour.

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ATLANTIC CITY, N.J.
CHICAGO, ILL.

YOUR AIRPORT DESERVES THE BEST, FLOODLIGHT WITH B. B. T.

GETTING THEM OFF THE GROUND AND UP!



FOUR times Wright's big trimotor soared over New York, each time laden with Presidents, Treasurers, and Sales Managers of great American companies. Less than one quarter of them had ever flown before. But all were eager to learn for themselves how planes are used in business.

Now, they know the comfort of flying. They know its ease, they could not help being impressed with its speed and its dispatch. In short they know the part in business transportation that the airplane is taking in the life of 1930.

Never mind how many planes were ordered, never mind how many Wright motors were sold, the important part was and is, that fifty big men were brought to flying.

As soon as the business side of aviation is proven practically to forward looking men . . . as soon as aviation's great advantages are experienced in the person, even pre-conceived ideas of its commercial value are raised.

The lesson is simple and not spectacular. The bigger the men who go up . . . the broader their views and the keener their business sense . . . the more readily they accept the advantage that Aviation gives. The better the candidates for the First Flight Club the more far reaching the result!



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